The Economics of Access to Graham's Island And Graham's Island State Park

June 29, 2004

Executive Summary

The total estimated benefits of Graham's Island and the Graham's Island State Park may be in excess of $70 million not including the sunk costs of the flood mitigation and previous road improvements. A conservative estimate of total assets is almost $8 million and the total income streams are estimated to be $64.8 million if 20 percent of the anglers were displaced from the Devils Lake Region. This compares to the $8.9 million cost estimated to raise the Graham's Island roadway. Therefore, it is vitally important for the Federal Highway Administration to add the Graham's Island road to its critical road list so the roadway grade can be raised with ER funds before it is completely inundated and Graham's Island becomes isolated.

Summary Table. Estimated Benefits of Graham's Island and Graham's Island State Park

FEMA expenditures - 1995 forward	$1,523,306
Department/C-District expenditures	$423,823
ER Funding 1995-1999	$3,695,000
Total Flood Recovery Expense	***$5,642,129***
Estimated Agricultural Assets	$2,300,000
Graham's Island Park Land and Facility	$5,697,527
Total Assets	***$7,997,527***
NPV of Displacement of 20% of Anglers using Graham's Island State Park	$42,615,862
Estimated Value of Construction Project Using I/O Multiplier	$21,360,000
NPV of Farmland for 20 Year Income Stream	$897,644
Total Income Streams	***$64,873,506***

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Background

The 2004 trend at Graham's Island State Park indicates an increase in visitors when compared to the 2003 season. Shelvers Grove, a campground east of Devils Lake on Highway 2 was closed this spring due to rising water. Graham's Island remains as one of the major recreation resources to the region and the state. Access to Graham's Island is in jeopardy with the projected increased lake elevations. Safety of visitors using the roadway is currently at issue with only 1.5 feet of freeboard. Debris has been plowed from the road on two occasions this spring after high waves deposited material on the road.

- **Attachments A** is an aerial photo of the Graham's Island area showing the location of the Grahams's Island road and the boat ramp located on the island.
- **Attachment B** is a map showing the location of the island in proximity to the Devils Lake area.

This information is presented to provide background information to support raising the elevation of Graham's Island road connecting State Highway 19 to Graham's Island and Graham's Island State Park. Devils Lake is one of the prominent fisheries in the region and limiting this tourism destination will impact not only Devils Lake but reach across the region and the state of North Dakota. Roughly 35 percent of the visitors are from out of state with Minnesota comprising over 30 percent of the out of state total.

It is difficult to determine the value of allowing access to continue to Graham's Island located in Devils Lake. Visitation to the Graham's Island State Park is shown to be growing. The island contains a sheltered boat ramp with limited wave action that is the premier boat ramp for providing a central location for access to Devils Lake. The boat ramp area also provides access for ice fishing during the winter months. There is also a 100 unit campground on the island, which is the largest campground in the Devils Lake area. Other facilities include a bait shop, cabins, and the Siebert Thompson Activity Center which are used year round. During the winter months skiing and snowmobiling trails are used extensively. The island is also used by birdwatchers throughout the year and turkey and deer hunters inhabit the island in the spring and the fall.

Several factors need to be included to arrive at the actual costs associated with abandoning Graham's Island. There are farming acres, pasture land, farmsteads with houses, other residences, and the value of the park assets. The income streams include the rent from farming and ranching, the park and camping fees, the bait shop and if the highway becomes impassable because of water issues some or all of these assets along with the income streams may be lost. This analysis will provide estimates of the economic benefits of Graham's Island to the Region and the State.

Fishing Expenditures

Bangsund & Leistritz from North Dakota State University have gathered information to determine the expenditures of resident and non-resident hunters and anglers. Their extensive work is used to evaluate trends and economic effects associated with hunting and fishing in the state. Through survey, Bangsund and Leistritz estimated the seasonal and daily expenditures for hunting and fishing for residents and non-residents. The average resident angler spent some $2,597 per year, while the non-resident spent an average of $884. The average daily variable and

fixed expenses were found to be $43.23 and $177 respectively for residents. The average daily expenses for non-resident anglers were estimated to be $136.47 each for variable expenses and $42.20 each for fixed expenses. These numbers are much higher than the AAA projections for a vacationing family's average daily expenses. AAA estimates daily expenses to be $41 per person.

It could be argued that if access to Graham's Island was limited or denied, fisherman would find alternative access. However, congestion and other issues may cause anglers to pursue other fisheries if there is uncertainty or long waits in accessing boat ramps and other facilities. The expenditures for displaced anglers would be lost at least to the Devils Lake region and possibly the state as it is estimated that 35 percent of the anglers are non-residents of North Dakota.

This analysis draws on Bangsund and Leistritz work in estimating the daily and annual expenditures of anglers. The method used to estimate the net present value of the use of Graham's Island is to estimate the income stream for anglers using the Island and estimating the number that would be displaced without the resource. Table 1 shows the estimated income stream for anglers over a 20 year period. Bangsund and Leistritz (2002), showed a growth rate of 1.14 percent increase in annual fishing expense for anglers in 2002 dollars.

Table 1. Displaced Angler Annual Expenditures

Years	Expenditures	Inflation Rate	End of Year	Annual Displacement
1	$178.42	1.14%	$180.45	$712,793.25
2	$180.45	1.14%	$182.51	$720,919.10
3	$182.51	1.14%	$184.59	$729,137.57
4	$184.59	1.14%	$186.70	$737,449.74
5	$186.70	1.14%	$188.82	$745,856.67
6	$188.82	1.14%	$190.98	$754,359.43
7	$190.98	1.14%	$193.15	$762,959.13
8	$193.15	1.14%	$195.36	$771,656.87
9	$195.36	1.14%	$197.58	$780,453.75
10	$197.58	1.14%	$199.84	$789,350.93
11	$199.84	1.14%	$202.11	$798,349.53
12	$202.11	1.14%	$204.42	$807,450.71
13	$204.42	1.14%	$206.75	$816,655.65
14	$206.75	1.14%	$209.11	$825,965.53
15	$209.11	1.14%	$211.49	$835,381.53
16	$211.49	1.14%	$213.90	$844,904.88
17	$213.90	1.14%	$216.34	$854,536.80
18	$216.34	1.14%	$218.80	$864,278.52
19	$218.80	1.14%	$221.30	$874,131.29
20	$221.30	1.14%	$223.82	$884,096.39

The Net Present Value (NPV) formula is used to estimate total net present values of an income stream or expense by using a discount rate and a series of future benefits. In this case anglers or

visitors' expenditures. The NPV investment begins one year before the date of the first value cash flow. The NPV calculation is based on future cash flows. The NPV formula can be expressed in:

$$\text{NPV} = \sum_{i=1}^{n} \frac{\textit{Visitors}' \text{ Expenditures}_i}{(1 + \text{rate})^i}$$

Using the income stream from Table 1 and the NPV formula based on a 20 percent displacement factor the NPV is estimated to be $42.6 million. The costs to the region increase dramatically as the number of anglers are displaced (Table 2). It is difficult to estimate the number that would be displaced. For the purposes of this analysis it could be assumed that 20 percent of the anglers would be displaced as there are limited boat ramps and camping facilities available in the area.

Table 2. NPV of Displaced Anglers to the Devils Lake Region if Access to Graham's Island is Closed. (Based on Bangsund and Leistritz daily expenditures for anglers)

10%	$21,307,931
15%	$31,961,897
20%	$42,615,862
25%	$53,269,828
30%	$63,923,793

Farming

There is also farm and ranch land on the Graham's Island. If access to the island was cut off there would be no way to transport the inputs to the island or the commodities raised from the island. In evaluating the economic impact again the NPV is used. First an income stream is estimated and then the NPV is used to calculate the economic impact. It could be estimated that land rents, or income would be conservatively $20 per acre for farm land and $10 per acre for pasture land. Using these assumptions and an inflation factor of 3 percent an income stream can be derived. The average income for the land would be $15 per acre for the first year and reflect the inflation rate of 3 percent thereafter. The NPV for the farmland for a 20 year income stream is estimated to be $897,644.

Assets

Property losses will also be incurred if access is eliminated to the island. Park assets include land and net improvements that would be abandoned. Table 3 shows these assets and their values along with the improvements.

Table 3. Current Value of Grahams Island State Park

Land value	$1,609,772
Facility Development	$4,087,755
Total Land and Facility value	*$5,697,527*

FEMA has also invested in Graham's Island State Park by providing funding for flood recovery and mitigation. This includes moving facilities and other mitigation efforts. These improvements are listed in Table 4. Table 4 also shows that the Graham's Island road has been the recipient of ER funding in the past. In 1995, $3.1 million was expended on the route and in 1999 approximately $595,000 was expended.

Table 4. Total Flood Recovery and Mitigation Expense

FEMA expenditures - 1995 forward	$1,523,306
Department/C-District expenditures	$423,823
ER Funding 1995-1999	$3,695,000
Total Flood Recovery Expense	*$5,642,129*

Other fixed assets include the farm and ranch land, farmsteads, and other dwellings. Table 5 shows the estimated value of the land and farmsteads.

Table 5. Estimated Agricultural Assets on Graham's Island

Farmland	2000 acres	$1,000,000
Pasture Land	2000 acres	$300,000
Farmsteads	10	$1,000,000
Total Ag Assets		*$2,300,000*

The above estimates provide a picture of the value of assets on the island. The total estimated value of the fixed assets are estimated to be $7,975,527 and when the sunk costs of flood mitigation and recovery along with previous road investment, the estimated value is $13,693,656. Not included in the estimate are a bait shop and two cabins.

Construction

In addition to the possibility that the Devils Lake region may lose fishermen and assets because of lost access to Graham's Island there is also the benefit that construction brings to the area. Similar to Bangsund and Leistritz's work the North Dakota Input-Output Model is a tool for describing the economic linkages and interrelationships of North Dakota's economy. The model can be used to estimate the impacts of various types of project developments in the State. In this case, the model provides a good basis of economic analysis in the construction of a road to Graham's Island. The Input-Output Model uses interdependence coefficients of 17 statewide sectors based on technical coefficients for the construction sector in North Dakota. The coefficients are an estimation of each sectors gross income from one dollar of construction in the state. The number for the Gross Receipts Multiplier for the construction industry is 2.44 which implies that for every dollar spent, it turns over, or is spent, 2.44 times within the state's economy.

The impact of the construction of the Graham's Island road would provide economic activity to the area. The estimated cost for the road construction is $8.9 million. Using the multiplier provided by the I/O model, the economic benefits to the region because of the construction are estimated to be $21.36 million.

Conclusion

The benefits of accessing Graham's Island and Graham's Island State Park located in Devils Lake are estimated to be very beneficial to the local economy. Visitation to Graham's Island State Park is shown to be growing. The island has a protected boat ramp providing access to the western part of the lake, a 100 unit campground, a bait shop, cabins, ski and snowmobile trails, an activity center, and hunting opportunities. Other assets included on the island are farm land, pasture land, farmsteads with houses, other residences, and the value of the park assets. Using Bangsund and Leistritz estimated angler expenditures to estimate the impacts to the region provides insight into the value of the fishing resource of Devils Lake. Income streams include the rent from farming and ranching, the park and camping fees, the bait shop and if the highway becomes impassable because of water issues some or all of these assets along with the income streams may be lost. Table 6 provides a summary of the costs and benefits of Graham's Island and Graham's Island State Park to the Devils Lake region and the state of North Dakota.

Table 6. Estimated Benefits of Graham's Island and Graham's Island State Park

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